REMARKS

Claims 1, 2 and 4 are rejected, under 35 U.S.C. § 102(b), as being anticipated by Beck `372. The Applicant acknowledges and respectfully traverses the raised anticipatory rejection in view of the following remarks.

Initially, the Applicant respectfully points out that the present invention is directed at a laminated composite structure for producing a high acoustical performance instrument, such as a drum or a string instrument, which has a noticeable sound improvement over prior art drum and string instruments, e.g., improved acoustic resonance, improved sustained sound, improved sound amplitude, and improved structural integrity. The improved acoustical performance has (a) improved dimensional stability for the laminated composite structure, whether it is a percussion instrument, a string instrument or a piece of furniture; as well as (b) improved longevity and performance stability for the laminated composite structure. The improved dimensional stability for the laminate imparts a reduction in localized stresses within the laminate structure and thus creates an internal equilibrium within the laminate. The improved longevity and performance stability of the laminate is a result of not only a creation of the internal equilibrium within the structure, but also, due to the selection of the additive type, the quantity and most importantly, the particle size for the hollow spheres contained within the laminate.

Turning now to the applied prior art reference of Beck `372, this reference relates to a low density space filling material. This sheet comprises a flexible carrier web and a dense mono-layer of low density filler bodies which are adhered to at least one side of the carrier web. The filler bodies are discrete hollow spheres. As shown in Fig. 9 of Beck `372, this drawing shows a 9 centimeter pipe section made with a first layer of glass fiber material then a sheet of the low density space filling material and then another layer of glass fiber. The entire assembly is then impregnated with an epoxy-resin-based composition. The discrete hollow spheres, as taught by Beck `372, are anywhere from ½-20 millimeters in diameter (see column 1, line 29; column 6, line 4, for example) and are from 1-20 millimeters in diameter,

as recited in the claims. The Applicant respectfully submits that such large particle size hollow spheres may eventually lead to crack propagation and/or early deterioration of the system. In any event, this reference clearly fails to in any way teach, suggest or disclose hollow spheres having a diameter of less than 500 microns, as presently recited.

The Applicant respectfully points out that for acoustical sound applications, the particle size, the distribution and other characteristics of the hollow spheres are critical for the acoustic performance of the resulting instrument to be manufactured from the claimed laminated composite structure. The improved sound qualities, e.g., acoustic resonance, sustained sound, and sound amplitude, as well as the improved structural integrity according to the present invention are fully described in the specification of the pending patent application. In fact, the hollow spheres influence sound waves which continue to travel and begin to form multiple harmonics and thus lead to the superior resonance effects associated with the claimed laminate of the present invention. The claimed laminated composite structure is meticulously designed for enhanced acoustical performance and includes a formulation having micro and nano-level hollow spheres, not ½-20 millimeters as specifically taught and disclosed by Beck `372.

In addition depended claims 2-10, 13-19 and 21 recite further limitations relating to different structural characteristics which further distinguish the claims from the cited prior art. These limitations include a variety of significant physical features of the hollow spheres such as the diameter of the hollow sphere, a density, a crush strength of the hollow spheres and a hardness as founc on the Mohs scale of hardness, etc.

In order to emphasize the above noted distinctions between the presently claimed invention and the applied art, independent claim 1 of this application now recite the features of "[a] composite structure comprising: a plurality of layers of laminate; and a layer of adhesive located between each adjacent layer of the plurality of layers of laminate; wherein the adhesive is a composite adhesive which has a plurality of hollow spheres intermixed within the composite adhesive to facilitate improving bonding between adjacent layers of the laminate, the hollow

spheres having a diameter of less than 500 microns". Independent claim 11 recites the features of the adhesive being

> a colloidal composite adhesive which has a plurality of hollow spheres coated with a trialkoxysilane coupling agent and uniformly intermixed within the composite adhesive to facilitate improving bonding between adjacent layers of the wood laminate, the coated hollow spheres being approximately between 5 and 300 microns in size, and the composite adhesive having a ratio of approximately 60-99% adhesive to 1-40% coated hollow spheres

while independent claim 20 further recites the features of the adhesive being

> a colloidal composite adhesive which has a plurality of hollow spheres, coated with a gamma-aminopropyltriethoxysilane coupling agent and intermixed within the composite adhesive to facilitate improving bonding between adjacent layers of the wood laminate, the coated hollow spheres being approximately between 1 and 88 microns in size, a density of approximately between 0.187 and 0.39 g/cc, a hardness of approximately between 5.5 and 6.0 on the Moh's scale of hardness, and a crush strength of approximately between 10,000 and 15,000 psi, and the composite adhesive having a ratio of approximately 90-97% adhesive to 3-10% coated hollow spheres; and a drum head being attached to at least one end of the laminated shell to form the percussion instrument.

Such features are believed to clearly and patentably distinguish the presently claimed invention from all of the art of record, including the applied art.

Turning now to claim 3, this claims is rejected, under 35 U.S.C. § 103(a), as being unpatentable over Beck `372 in view of Meteer et al. `642. The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the following remarks.

With respect to claim 3, the Examiner asserts that Beck `372 discloses the claimed invention except that the coupling agent is a silane-coupling agent. The above remarks concerning Beck `372 are incorporated herein in response to this rejection. In addition, with respect to the applied Meteer et al. `642 reference, the Applicant notes that in column 5, line 52, Meteer et al. `642 teaches a structure using a "silane coating to facilitate wet out of the microspheres, which [in turn] results in better adhesion." As the Examiner is aware"to wet out"

refers to how well a liquid flows and covers a surface of, in this case, the microspheres. Meteer et al. `642 reduces the surface tension/surface energy of the additive, to facilitate wet out, by adding a surface-active agent containing silicone. The silane coating of Meteer et al. `642 is a surfactant containing a silicone constituent. The surfactant coating enables the matrix binder--a mixture including a phenolic resin--to better coat the microspheres which, in turn, results in better adhesion. It is not the silane coating which adheres the microspheres together but the silane coating only aids the matrix binder in doing so. In view of the foregoing, the Applicant adamantly asserts that the silane coating of Meteer et al. `642 is distinctly different than the claimed silane coupling agent of the presently pending claims.

Claims 5 and 10 are then rejected, under 35 U.S.C. § 103(a), as being unpatentable over Beck `372 in view of Seal `568 while claims 6-9 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Beck `372 in view of Janes et al. `527 and Adinolfi `551. Claims 11 and 20 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Adinolfi `551 in view of Beck `372 while claims 12-14 and 16-19 are rejected under 35 U.S.C. § 103(a), as being unpatentable over Adinolfi `551 in view of Beck `372 as applied to claims 11 above, and further in view of Meteer et al. `642. Claim 15 is rejected, under 35 U.S.C. § 103 (a), as being unpatentable over Adinolfi `551 in view of Beck `372 as applied to claim 11 above, and further in view of Seal `568. The Applicant acknowledges and respectfully traverses all of the raised obviousness rejection in view of the following remarks.

The Applicant notes that claims 5-20 are rejected in view of various combinations of the applied art of Beck `372, Adinolfi `551, Seal `568, Janes et al. `527 and/or Meteer et al. `642. All these rejected claims relate to one aspect or another of the coupling agent, the hollow spheres, and the laminates as well as specific amounts and combinations thereof.

In reply to all of the above raised rejections, the above remarks concerning Beck `372 are incorporated herein. With respect to the base reference of Adinolfi `551, the Applicant submits the following remarks in response to the raised rejections in view of Adinolfi `551.

The Applicant acknowledges that the reference of Adinolfi `551 contains generally two acoustical drums and more particularly to a reinforced drum shell structure for receiving a rotatable head. The Applicant agrees with the Examiner that this reference fails to in any way teach the hollow spheres, as presently recited in the pending claims. In order to overcome this deficiency, the Examiner combines the teaching of Adinolfi `551 with Beck `372. However, as noted above, although Beck `372 may relate to a sheet material with a flexible carrier web and a monolayer of the uniform sized discreet low-density filibodies adhered to the carrier web, the Applicant respectfully submits that the applied combination still fails to teach, suggest or disclose the above recited features of the present invention, namely, the hollow spheres intermixed within the composite adhesive to facilitate improving bonding between adjacent layers of the laminate, and the hollow spheres having a diameter of less than 500 microns.

The Applicant acknowledges that the additional references of Seal `568, Janes et al. `527 and/or Meteer et al. `642 may arguably related to the features indicated by the Examiner in the official action. Nevertheless, the Applicant respectfully submits that the combination of the base references of Beck `372 and/or Adinolfi `551 with this additional art still fails to in any way teach, suggest or disclose the above distinguishing features of the presently claimed invention. As such, all of the raised rejections should be withdrawn at this time in view of the above amendments and remarks.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejection(s) should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejection(s) or applicability of the Beck `372, Adinolfi `551, Seal `568, Janes et al. `527 and/or Meteer et al. `642 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure

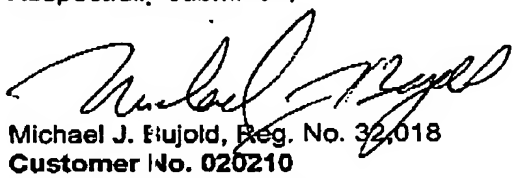
required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



Michael J. Bujold, Reg. No. 32,018
Customer No. 020210
Davis & Bujold, P.L.L.C.
Fourth Floor
500 North Commercial Street
Manchester NH 03101-1151
Telephone 603-624-9220
Facsimile 603-624-9229
E-mail: patent@davisandbujold.com